

**CLAIMS**

1. A method for treating a gas mixture comprising at least propylene and propane (1, 6) in order to  
5 separate the propylene from the propane, in which the gas mixture (1) is contacted with a membrane (M1) carrying out the selective permeation of propylene with respect to propane so as to obtain a propylene-enriched permeate (2) and a propane-enriched retentate (3),  
10 characterized in that the propylene concentration of the permeate in the membrane is decreased by means of a sweeping gas (4).

2. The method as claimed in the preceding claim,  
15 characterized in that the membrane (M1) consists of a material selected from polyimides, polyphenylene oxides and polymers.

3. The method as claimed in claim 1 or 2,  
20 characterized in that it is put into practice during a polypropylene polymerization method and in that the sweeping gas (4) is a gas comprising ethylene.

4. The method as claimed in one of the preceding  
25 claims, characterized in that the gas mixture to be treated (1) further comprises hydrogen and in that before the step of contacting the gas mixture with the membrane (M1) carrying out selective permeation of propylene with respect to propane, the gas mixture (1)  
30 is contacted with a membrane (M2) carrying out the selective permeation of hydrogen with respect to propane and to propylene in order to obtain a permeate (5) enriched with hydrogen and a retentate enriched with propylene and with propane (6).

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5. The method as claimed in the preceding claim, characterized in that the membrane (M2) carrying out the selective permeation of hydrogen consists of a material selected from polyamides and polyimides.

6. The method as claimed in claim 4 or 5, characterized in that the hydrogen concentration of the permeate in the membrane (M2) carrying out the selective permeation of hydrogen is decreased by means of a sweeping gas (7).

7. The method as claimed in the preceding claim, characterized in that the sweeping gas (7) used during the selective permeation of hydrogen is a gas comprising nitrogen.

8. A polypropylene polymerization method, comprising the following steps:

- a) polymerization of propylene,
- b) recovery of an effluent issuing from step a) and comprising at least polypropylene, propane and propylene,
- c) treatment of the effluent from step b) in order to produce a solid effluent comprising at least polypropylene and a gaseous effluent (1) comprising at least propane and propylene,
- d) treatment of at least a part of the gaseous effluent (1) issuing from step c) in order to separate the propylene from the propane, in which at least a part of the gaseous effluent (1) is contacted with a membrane (M1) carrying out the selective permeation of propylene with respect to propane in order to obtain a propylene-enriched permeate (2) and a propane-enriched retentate (3), and the propylene concentration of the permeate in the membrane is decreased by means of a sweeping gas (4),
- e) introduction into the copolymerization section of the propylene-enriched permeate (3) issuing from the membrane (M1) carrying

out the selective permeation of propylene with respect to propane.

9. The method as claimed in claim 8, characterized in that the membrane (M1) consists of a material selected from polyimides, polyphenylene oxides and perfluoropolymers.

10. The method as claimed in either of claims 8 and 9, characterized in that the gaseous effluent (1) issuing from step c) also comprises hydrogen and in that before the step of contacting of the gaseous effluent (1) with the membrane (M1) carrying out the selective permeation of propylene with respect to propane, the gaseous effluent (1) is contacted with a membrane (M2) carrying out the selective permeation of hydrogen with respect to propane and to propylene so as to obtain a hydrogen-enriched permeate (5) and a retentate (6) enriched with propylene and propane.

11. The method as claimed in the preceding claim, characterized in that the membrane (M2) carrying out the selective permeation of hydrogen consists of a material selected from polyamides and polyimides.

12. The method as claimed in claim 10 or 11, characterized in that the hydrogen concentration of the permeate in the membrane (M2) carrying out the selective permeation of hydrogen is diluted by means of a sweeping gas (7).

13. The method as claimed in the preceding claim, characterized in that the sweeping gas (7) used during the selective permeation of hydrogen is a gas comprising nitrogen.

14. A polypropylene polymerization method as claimed in one of claims 8 to 13, characterized in that step a) is a polypropylene copolymerization step.

15. The method as claimed in the preceding claim, characterized in that the sweeping gas (4) is a gas comprising ethylene.

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16. The method as claimed in one of claims 8 to 13, characterized in that the effluent (1) issuing from step c) is mixed with a gaseous effluent (1') issuing from the successive sequence of a step a') of  
10 polypropylene copolymerization, followed by a step b') of recovering of the effluent issuing from step a') and comprising at least polypropylene, propane and propylene, followed by a step c') of treatment of the  
15 effluent from step b') so as to produce a solid effluent comprising at least polypropylene and the gaseous effluent (1') comprising at least propane and propylene.